CLAIMS

We claim:

1. An apparatus for launching a projectile comprising:

a power source;

a control circuit coupled to said power source;

a motor;

means for coupling said control circuit to said motor for the purpose of directing power from the power source to the motor;

a linear motion converter;

means for coupling said motor to said linear motion converter;

a piston;

means for coupling said piston to said linear motion converter;

a cylinder, with a front end and a rear end, in which the piston moves back and forth from the rear end to the front end of the cylinder;

a valve;

a barrel;

means for controlling the valve in order to direct air that is compressed by said piston from the cylinder to the barrel; and

a projectile located in the barrel wherein said projectile is released from the barrel due to compressed air being forced from the cylinder to the barrel through the valve.

2. An apparatus for launching a projectile comprising:

a power source;

a control circuit coupled to said power source;

a motor;

means for coupling said control circuit to said motor for the purpose of directing power from the power source to the motor;

a linear motion converter;

means for coupling said motor to said linear motion converter;

a piston;

means for coupling said piston to said linear motion converter;

a cylinder, with a front end and a rear end, in which the piston moves back and forth from the rear end to the front end of the cylinder;

a valve;

a barrel;

means for controlling the valve in order to direct air that is compressed by said piston from the cylinder to the barrel;

a projectile located in the barrel wherein said projectile is released from the barrel due to the compressed air being forced from the cylinder to the barrel through the compressed air passageway;

a bolt located within the barrel; and

means for coupling said bolt to said piston to enable the bolt to move within the barrel at the same time as the piston moves within the cylinder.

3. The apparatus according to Claim 2, wherein the means for coupling said bolt to said piston comprises at least one link.

4. An apparatus for launching a projectile comprising:

a power source;

a control circuit coupled to said power source;

a motor;

means for coupling said control circuit to said motor for the purpose of directing power from the power source to the motor;

a direct mechanical air compression means;

means for coupling said motor to said direct mechanical air compression means;

a start switch;

means for controlling said direct mechanical air compression means in response to said start switch;

a valve;

a barrel;

means for directing compressed air through the valve to the barrel;

a projectile located in the barrel wherein said projectile is released from the barrel due to the compressed air being forced through the valve;

a control circuit input; and

a means to disconnect the power source from the motor in response to the control circuit input.

5. The apparatus according to Claim 4, wherein the direct mechanical air compression means includes a linear motion converter.

6. The apparatus according to Claim 4, further comprising a bolt located within the barrel and a means for coupling said bolt to said direct mechanical air compression means to enable the bolt to move within the barrel.

7. The apparatus according to Claim 4, wherein the direct mechanical air compression means is a rotary compressor.

8. The apparatus according to Claim 4, wherein the control circuit input includes a pressure transducer.

9. The apparatus according to Claims 1, 2 or 4, wherein the power source is a battery.

10. The apparatus according to Claims 1, 2 or 5, wherein the linear motion converter is a lead screw.

11. The apparatus according to Claims 1, 2 or 5, wherein the linear motion converter is a slider crank mechanism.

12. The apparatus according to Claims 1, 2 or 4, wherein the valve is electrically controlled.

13. The apparatus according to Claims 1, 2 or 5, wherein the means for coupling the motor to the linear motion converter has at least one gear.

14. The apparatus according to Claims 1 or 2, wherein the means for coupling the linear motion converter to the piston is a lead nut.

15. The apparatus according to Claims 1, 2 or 4, wherein the means for controlling the valve is in response to air pressure or piston displacement.

16. The apparatus according to Claims 1, 2 or 4, wherein the projectile is selected from the group consisting of a paintball, an airsoft ball, a "bb", and a pellet.

17. The apparatus according to Claims 1, 2 or 5, wherein the means for coupling said motor to said linear motion converter uses a different coupling ratio for the forward stroke of the piston than for the return stroke of the piston.

18. The apparatus according to Claims 1 or 2 , wherein the piston is partially advanced within the cylinder to pre-compress air within the cylinder.

19. The apparatus according to Claims 1, 2 or 4, further comprising one or more sensors.

20. The apparatus according to Claims 1, 2 or 4, further comprising a means to change the release point of the compressed air on response to user adjustments.

21. The apparatus according to Claims 1, 2 or 4, further comprising energy absorbing bumpers are used at the ends of stroke.

22. The apparatus according to Claim 1, 2 or 4, wherein the time frame for a complete cycle is less than one second.

23. The apparatus according to Claim 1, 2 or 4, wherein the control circuit includes at least one non-contact sensing means.

24. The apparatus according to Claims 1, 2 or 4, wherein the control circuit includes a switch which allows either semiautomatic, burst mode or automatic firing.

25. The apparatus according to Claims 1, 2 or 4, wherein the control circuit is further comprised of a microprocessor.

26. The apparatus according to Claims 1, 2 or 4, wherein the time between the actuation of the start switch and the projectile exiting the barrel is less then 1000 milliseconds.

27. The apparatus according to Claims 1, 2 or 4, wherein the control circuit has the ability to store more then one actuation of the start switch.

28. The apparatus according to Claims 1, 2 or 4, wherein the control circuit has a low battery warning.

29. The apparatus according to Claims 1, 2 or 4, wherein the control circuit is contained within the handgrip of the apparatus.

30. The apparatus according to Claims 1, 2 or 4, wherein the control circuit includes a shot counter.

31. The apparatus according to Claims 1, 2 or 4, wherein at least a portion of the power is routed through the start switch.

32. The apparatus according to Claims 1, 2 or 4 wherein the valve moves from a closed to an open position in less then 100 milliseconds.